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Volume XVII AUGUST 1956 Number 8

DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

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2. Rodriguez-Gomez, M.; Valdes-Rodriguez, A., and Drew, A. L.: J.A.M.A. 160:752 (Mar. 3) 1956.

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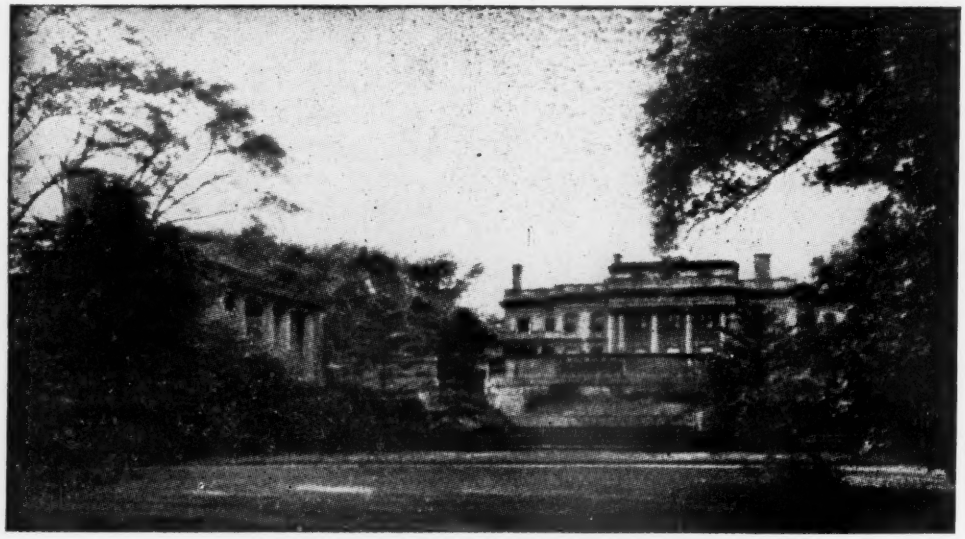

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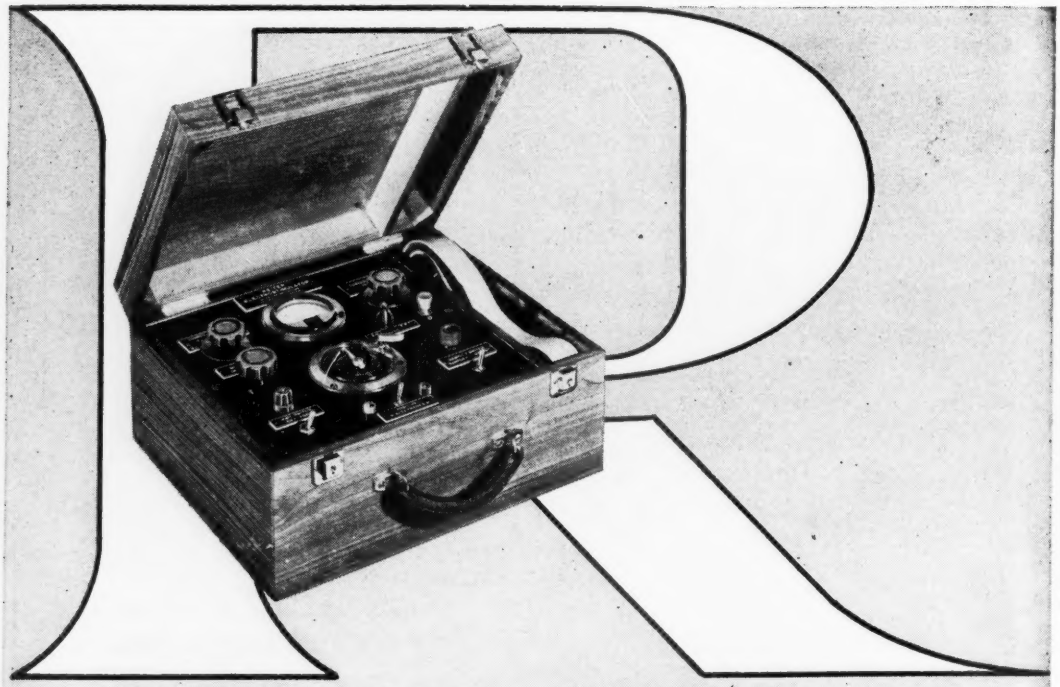

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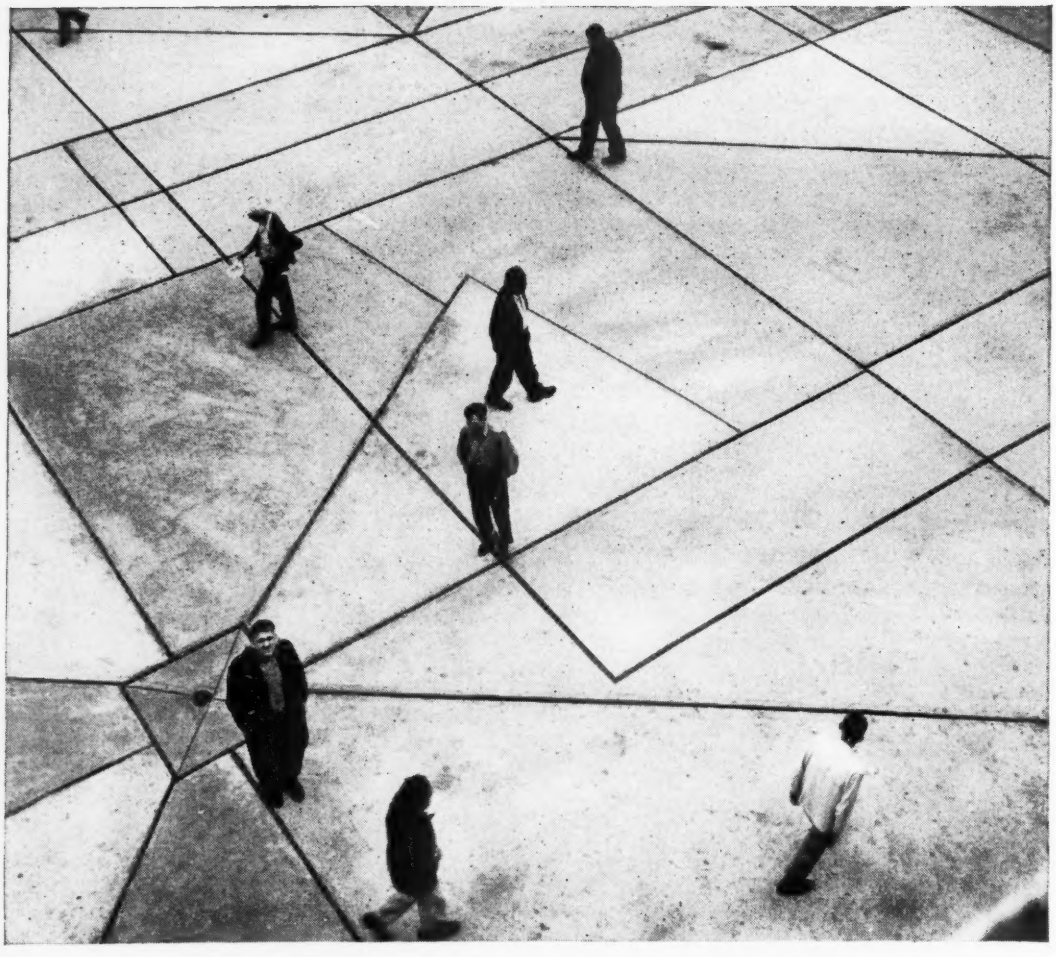

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1. Hoffman, J.L.: in Chlorpromazine and Mental Health, Philadelphia, Lea & Febiger, 1955.

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DISEASES *of the* Nervous System

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

Psychiatric Problems in Young Adult Cerebral Palsied Patients

JOSEPH D. SULLIVAN, M.D.
New York, New York

The psychiatrist whose main work is with adults is called upon from time to time to evaluate and treat cerebral palsied patients in whom there are psychiatric presenting symptoms or complaints. It will be immediately recognized that such patients have suffered from special deprivations in play, social and interest development, and interpersonal relationships. Some will have intellectual limitation, and others more circumscribed perceptual, expressive or coordinative defect. They will have encountered overprotectiveness or rejection from their parents, and often the parents will have been ambivalent in their feelings to the child. The child is more than likely to have become very sensitive to the subtleties of feeling of the members of his own family and the community. Some distortion of thinking or illogicality of association of ideas might well be expected. Similarly, unrealities of self-estimation might be anticipated with either secondary withdrawal or exaggerated hopefulness.

Several autobiographies have been written by exceptional people who suffer from cerebral palsy.[1,2,3] There have been many works written about the special problems of palsied children. Among these are books for parents,[4] educators,[5] physicians,[6] and there are texts[7,8] which review the disorders and their management from many points of view. These texts give an extensive bibliography. They are mainly concerned with children, although there are some references to personality problems in young adults.

In the course of five years at the Institute for the Crippled and Disabled the writer has had contact with several hundred cerebral palsied young adult patients. These patients have been seen in individual psychiatric evaluation on at least one occasion. Many have been seen frequently by the writer and still more have been followed in various stages of schooling and rehabilitation through other workers. Some of these patients have received intensive support from case workers and psychologists under the supervision of the writer. Others have been in a special psychological retraining regime with Miss Marion Reissenweber, who is also a member of the writer's staff. In this latter work there is evaluation of individual limitations of brain damage such as depth perception, figure reversals and hand-eye coordination. Many original methods of dealing with these problems have been devised.[9] Speech therapy is the principal activity of some patients. Some are in physical rehabilitation, others in industrial and vocational programs at the Institute. Almost all have participated in group and recreational activities in which

From Mental Hygiene Clinic and Social Adjustment Service, Institute for the Crippled and Disabled, and Psychiatric Department Cornell University Medical College.

the writer has shared some of the responsibilities.

There has been a wide range of emotional instability encountered. Some few patients have shown little or no social or psychological disturbance. At the other end of the range frankly psychotic behavior and thinking have occurred in a significantly large enough group of the patients to warrant the diagnosis, cerebral palsy with psychosis. These latter reactions are of such nature and quality that they might be considered schizophrenic if they occurred in a non-palsied patient. It is the writer's opinion that they should be separated from schizophrenia.

It is our observation and opinion that a very large percentage of young adult cerebral palsied patients show more or less of the psychological syndrome now to be described.

There is considerable social estrangement with concomitant autism and withdrawal. There are exaggerated day dreams, fantasy and preoccupation with extraordinary future achievement. In the practical order of working with the patient, unrealistic goal formation is almost always a serious problem. Many young people with athetosis or spasticity speak of becoming surgeons, architects and biologists. Often they do not want jobs in which they will dirty their hands. The patients have encountered great ambivalence in the attitude of their parents and those close to them. They become sensitive to this and are likely to be quite suspicious of those who would help them. Outbursts of rage are not uncommon when the patient feels frustrated in some immediate goal. The patient has been deprived of many normal life experiences, such as running, playing and group participation. His sense of belonging and acceptance by others has almost always undergone limitation and he has heightened awareness of his own singularity. When he encounters group acceptance, he may be unprepared for it emotionally. He may over-react to this heady wine and become overly talkative, overactive, and attempt to lead and dominate others at least for short periods. Grandiosity with overexpenditures of money may occur.

Two cases of cerebral palsy manifesting serious psychopathology will be described.

R. H. was born in 1929. He was seen in the Institute in 1954. He suffers from a spastic paraplegia, with only slight involvement of the upper extremities and none of the cranial nerves and speech. He has had a number of orthopedic procedures including a triple arthrodesis. He walks with two crutches and with a peculiar spastic and circumductive gait but is quite efficient and brisk. He received some gait training at the Institute and was tried on various medications to promote muscular relaxation. He had considerable verbal facility and showed no interest in a trade training program requiring hand skills. He had had two years of college and some months at an accounting school but was quite indecisive regarding his eventual vocational goals. It was planned that the Institute develop better work habits. He showed improvement during the year in his gait and entered into the social activities of the Institute with considerable enthusiasm.

A striking personality disturbance occurred at about Christmas of 1954. This was characterized by overactivity, overtalkativeness and the demand by the patient for recognition of relatively exaggerated abilities with some feeling of exhilaration. He stated that he had done considerable work on a Christmas play, that he revised and adapted the play. He discovered talents and encountered success in a measure which he had not previously achieved. He stated that after this success he deliberately sought and achieved overindulgence in alcohol. He stated that he became very much excited after this; he stayed up about three nights in a row. He had very strange and unusual thoughts. At times he thought he was dead. He became very much concerned with existentialism. He stated that he saw phallic symbols in many pointed objects. He had now revised entirely his aims and purposes. He no longer sought a job or wanted to go to college, as he said at one time he thought he wanted to do. He protested against parental pressure upon him to get settled in life and to take a job.

We spoke with the patient's father who stated that he had been afraid to let the patient go out at night for fear that he might get further excited. He stated that he had been very irrational in his talk and that it was necessary to summon a physician over the weekend. The father stated that the patient spoke of feeling that he had had a revelation and that he loved everyone. The father stated that this had been going on since Christmas. The father stated that the patient took on the part of a holy person at the Christmas play and he felt that there had been some delusional continuance of the role. The father stated that since his excitement it had been his observation that the patient seemed to have "women on his mind."

Because of the patient's hypomanic attack it was not possible for him to continue his activities in the Institute. Evidently, the disturbed behavior and thinking persisted approximately for three months in all. He received psychiatric assistance elsewhere, including chlorpromazine medication. We

understand from the social worker, who had some contact with the family that he had adjusted to a more satisfactory level of behavior. The patient refused to return to the Institute for further rehabilitation because he resented his discontinuance when he was acutely ill.

The patient had been seen previously in psychiatric consultation in September of 1954 at which time it was noted that he was in considerable conflict with authority. He put a tremendous amount of energy into making people admire him. It was noted that he had no consistent working habits and was fearful of disappointment and failure. He did not consider himself to be disabled but thought of himself as a "disembodied mind."

The second case is T.R. This patient was born in 1919. He was first seen by the writer in August of 1948. He had been hospialitzed at the Payne Whitney Psychiatric Clinic for ten months prior to his visit to my office. The reason for his hospitalization was anxiety, delusions of reference, a suicidal attempt and panic. The patient had been troubled, prior to hospitalization, with feelings of sexual peculiarity, that he was sexually and socially inadequate, and he began to feel that everyone thought that he was homosexual. He had some unfortunate sexual experiences in attempting to date several girls. He began to have paranoid ideas referring to his sexual inadequacy and in late August of 1947 attempted suicide by hanging from the wire but was saved when the noose broke. Thereafter he became increasingly tense and anxious, and worried more about his presumed sexual abnormality. He began to have more and more delusions of reference and suffered from sleep difficulties.

Physically the patient suffered from spasticity and athetosis of all four extremities. He was of superior intelligence. He was educated as a lawyer although he did not actually practice this profession except in a very limited way. The patient was an only child. His family was very well-to-do and he was himself, financially, very well off. His father was said to be alcoholic. He had very strong hostile and critical feelings with regard to his father. He had been very fond of his grandfather who had brought the boy up in his establishment. He had always tried very hard to please his grandfather by doing well academically. This he was able to accomplish despite an illegible handwriting because of special provisions that were made for him. He never got along particularly well with his contemporaries, although he did get along well with his teachers. He was always described as excessively conscientious about school work and very insecure socially.

Upon completion of law school he worked for some time at odd jobs not related to the law until about a year after graduation, at which time he was successful as secretary to a judge for a few months. He was transferred to work for another judge, and in all, did moderately successfully in this type of work for about nine months. During this employment, however, he made frequent social blunders and he continued to feel insecure. He began to feel, also, that he could become successful as a corporation lawyer in his home city and friends did something to encourage him in this attitude.

The patient for a very long time had been preoccupied with heterosexual fantasies and he was occupied in masturbation about which he experienced considerable guilt feelings. While in the hospital he stated that "my difficulty has been my inability to adjust to the people around me as I should; also, I have a sexual problem."

At the hospital he tended to exclude himself from the group by indulging in reading. He discussed his grandfather's stress upon academic success and discussed the obvious role of intellectual achievement as a compensation for his physical difficulties. He discussed his handicaps in college and law school, his need to succeed, his fear of failure, and actually his frequent avoidance of successful enterprise because of his insecurity about being able to perform adequately. He went into his need for justice and his identification with the underdog for whom he felt strong sympathy and he discussed his liberal political and religious beliefs. He brought out his life-long self-consciousness about his appearance and his image of himself as an unattractive, awkward, impulsive and sexually revolting individual.

During hospitalization he began employment with the Legal Aid Society as a volunteer and he was still engaged in this activity at the time of discharge when he was first seen by the writer. At first he was seen on about a weekly basis, but later he would tolerate about only one interview a month. He discussed himself as having a little sadistic tendency. He stated that when he was well he tended to tease people a great deal. He often felt lonesome and melancholy, especially over holidays. Sometimes, he felt that women had sexual designs upon him. There was a girl working in the office, who, he felt, knew something about his family history. She had made mention of a woman with a first name similar to that of an aunt of his. He began to believe that in some way this girl wanted him to go back to his home town and that she might be in league with one of his relatives. At times he would meet people from his home city and enjoy their company. At other times he was resentful and suspicious of why they looked him up. If people from his home town did visit New York and not call upon him, he was very critical of them and interpreted their activities as rejection. He became suspicious of other workers in his office, especially one of them who mentioned that at one time he had visited the city of patient's origin. He would recognize that his mind was on a suspicious trend and, as he said, sometimes he would become very suspicious about those who seemed friendly towards him. This would be especially true of any young women who seemed to be pleasant.

At times the patient's mood would become moderately elated; excessive laughter would be appar-

ent during interviews. Sometimes he would deride all those about him. He would say that sometimes he would get into the habit of thinking like people around him. He would become philosophical and state that he could see his life more clearly than he had been able to in the past. At one time he tried to be like the crowd, but basically the crowd was really very unhappy.

He would become very critical of his father. He would charge him with never having done anything constructively. He would speak of his own stoicism and of his father's desire for pity. In March of 1950 the patient began to make plans to open his own office. He did not really plan to practice but he planned to concentrate on a book on insanity and the law, and he planned to hire a secretary and purchase dictating equipment. He actually did open this office toward the end of 1950. He discontinued seeing the writer in February of 1951. We did not hear from him subsequently until November of 1955. The writer was called in psychiatric consultation to see the patient at the Westchester division of the New York Hospital where he had been committed for about three and a half years. Just prior to his hospitalization he had been spending extravagant amounts of money and had signed some checks without sufficient funds in the bank to cover them. It was because of some action arising from one of these checks that the Court ordered his hospitalization.

The doctors advised us of his extreme hostility, failure to cooperate and his eternal litigiousness. He had secured a writ and was planning to take all legal moves necessary to secure his release. He greeted the writer affably and sought to enlist his aid in his attempt to be released. It was the recommendation of the writer that he should not be released into his own care. Subsequently, he was discharged from the hospital in the custody of a relative who accepted this responsibility.

The next four cases show less flagrant psychopathology and are more representative of disturbances which are frequently encountered.

R. S. was born in 1927. He was seen at the Institute for the Crippled and Disabled in 1953 and subsequently. This patient had a moderately severe athetoid cerebral palsy with marked speech difficulty and internal squint of the right eye. The patient was excessively apologetic with regard to his awkwardness. He showed marked limitation in arithmetic function. He was living with his mother who was working. However, there was serious emotional difficulty between the patient and his mother.

At times during his training at the Institute there were episodes of serious rage arising most generally in the relationship between himself and his mother. At other times he was placed in a home but here, too, he demonstrated explosive instability at times. He was considered to be of average to superior intelligence. The patient had the ambition of getting into the magazine subscription business. He himself explained that he had outbursts of temper at which times he became "violent" and after the outburst he became severely depressed and guilty. At the time of the writing of this report this patient was to be worked with in speech therapy and psychological retraining, and with vocational advisors who were assisting him to make some development of his part-time, somewhat sheltered business venture.

The next case is B. S. He was born in 1937 and was seen in 1953 and subsequently. The patient had spastic paralysis of the inferior extremities and athetosis of the upper extremities, moderate speech difficulty and some athetosis of the neck. When speech was attempted there was considerable muscular tension demonstrated in the arm and shoulder and hand. The patient showed no disturbance of sensorium. There were no serious disturbances of overt behavior except social withdrawal. There were excessive smiling and some grimacing. The latter was difficult to separate entirely from the patient's movements associated with his physical disability.

The patient was friendly, under productive and withdrawn. There was evidence of considerable fantasy life. The patient was fond of television, especially popular musical and mystery programs. He was constantly preoccupied with the possibility of his participating as a spectator in the rehearsal of television programs. He would like to spend a lot of time in studios, watching actors rehearse. He had had a little experience at this and liked the excitement very much. He daydreamed about a performer who lived in his neighborhood. One time this performer was attended by the patient's father who was a physician. This was very thrilling to the patient.

The patient did not like to work with his hands. He disliked getting his hands dirty. He stated that he liked the Institute well enough, but it was apparent that he preferred very much to be associated with famous people. He asked for advice as to whether or not it would be right for him to approach other young people to accompany them more. He wondered if it would be right because he was so slow and they were so quick, and he wondered if they would have enough patience with him. He stated that when he was with others of his age, he felt that their activities and behavior made him feel ever so much younger. He experienced this same sort of feeling with other persons younger than himself.

During his rehabilitation program he had been under very constant supervision by one of the staff psychologists. A great deal of this patient's preoccupation was with what others thought of him. If other people drew close to him or seemed to want to be friendly to him, he became very suspicious of them. There had been no serious emotional outbreaks during the time that he was at the Institute.

The next patient is J. F. He was born in 1924. He was first seen in 1953. He suffered from a mod-

erately severe generalized athetosis with speech involvement. He was talkative and used words quite well despite his disability. He was extraverted in temperament, very friendly and somewhat socially manipulative. He saw himself in the future as somehow utilizing his verbal powers in order to gain a living for himself rather than earning a living by hand work.

He voiced his history in an orderly and more or less enthusiastic and persuasive fashion with evidence of probable rehearsal and frequent repetition. He had, indeed, considerable persuasive powers and employed oratorical devices very well in his presentation. He stated, "I am 19 years of age. I completed high school in Northern Westchester on June 21, 1952. I am looking for vocational training. I have had four jobs since I finished school. First, I cut high grass with a scythe in areas which tractors could not reach. Then, I bought a power mower which cost $140.00 and cut grass for a month and a half. Then, I got a job working in a nursery. I planted gladiola bulbs for a month, with my two hands constantly in the dirt. Then, I stayed home two months. This was a very frustrating experience.

"The little town in which I live is a typical country community. It is more or less a summer resort. All the work is in the summertime. There is no transportation. There is only one bus to a larger town and that's all. If I go to church I hitchhike. If I go to town I have to walk. It has done my legs a lot of good, but I can't go on with this type of thing indefinitely.

"Recently I got a job to take paint and varnish off furniture. The reason why I took this job is because it is a mile and a half away from my home. I walk through the woods whether it is raining, sleet or snow. It is a filthy job. The chemical remover is very unhealthy. It has burnt the hair off my arms. If the paint does not come off with the remover, then it must come off with a scraper, and I mean a scraper—it's hard work. I have been working at this for four and a half months at 85c an hour. I cough nights and it is not good for my lungs. My parents want to me quit. I am a very independent boy. I like to pay my own way. At nights I have a portable typewriter. The subject of psychology fascinates me. It increases my understanding of people. I have done much reading and writing on the subject. I do not expect to ever accomplish anything in this field because there are so many people who are more trained than I am. I'd like a job in which I could express myself. I think I could get some work with a lot of speech therapy. I would like to use my voice. I think I will earn more than I would ever earn with my hands. In school I majored in science. I did not get too good marks because my handicap kept me down.

"In high school I had to make a hard choice. I had to choose to further myself either mentally or physically; I thought I could not further myself mentally. Therefore, I spent the majority of my time in a gym and speech training. I passed all my subjects. I was the only palsied boy in the school. There was absolutely no special consideration for me. There could not be. I took the regular examinations and the teachers were not allowed to help me. In the science course biology fascinated me.

"To get back to my interest in psychology—I had over a hundred pages of definitions. Many of them, of course, are not original. There is a lady, half a mile away, who majored in sociology. I don't mean to brag but she thinks that I do very well. Nothing can defeat determination. Mother and father have been remarkable. They let me join the Boy Scouts and go hiking. I have traveled to New Jersey on my own."

Psychometric testing done elsewhere revealed normal scoring in the verbal areas, with considerable limitation in areas involving abstract thinking. In the vocational guidance evaluation it was found that in work requiring good dexterity and manipulative skills he had inferior aptitudes due to his physical disability. It was not thought that he could function adequately in any assembly type work. It was recommended to the State Department of Vocational Rehabilitation, the referring agency, that inside messenger work was a distinct possibility. It was also recommended by the vocational guidance counselor that "he is a friendly, likable boy who is quite dependent, lacks assurance and is not inclined to stick to a job that does not measure up to his ideals." No specific psychiatric diagnosis was made beyond cerebral palsy with some personality instability.

The next case is that of R. M., who was born in 1933. He was first seen in 1952. There were only mild evidences of cerebral palsy. There were moderate spasticity and incoordination of the upper extremities. There was a history of some clinical ataxia in the legs previously, and some history of convulsive disorder. At the time of medical examination, however, the physical disability was limited to some incoordination of the hands. This patient was a physician's son and had been evaluated psychologically on many occasions. He had attended special schools for handicapped children. He was regarded as being of approximately normal intelligence with greater facility in the verbal than in the performance and mathematical areas.

When seen in psychiatric consultation it was apparent, despite the above reports, that there was considerable limitation in reading ability and there was a gross disturbance of arithmetical functioning. The patient tended to explain his arithmetic difficulties largely on a psychological basis; thus, he pointed out that his father and brother attempted to drill him in arithmetic and they were harsh to him and thus, a block was set up in his learning arithmetic. He complained that his father and brother were hostile and rejecting of him. The patient had considerable sexual preoccupation and was sometimes alarmed by the proportions which these fantasies took, which he said "were sometimes really terrifying."

The patient's parents had been divorced and the father was now remarried. The patient alternated in living between the two parents. During our relationship with the patient here at the Institute it became apparent that he was quite socially manipulative and that he probably provoked each of his parents against the other. Serious difficulties in relatedness to people generally, emotional instability, and unreality goal-thinking were manifested during his stay at the Institute. He was worked with therapeutically by one of our psychologists on a relatively intensive basis. Toward the end of 1953 a position was obtained for him at a charitable agency where he was employed doing simple filing and inside messenger work.

A clinical observation of extraordinary perceptiveness has been made by Phelps.[10] He has linked spasticity with intraversion, repression of hostility, fearfulness and timidity. Conversely, he believes that the athetoid child is outgoing, easily expressive of hostility or affection and relatively less fearful. This personality formulation has recently been challenged by a number of writers;[7] nonetheless, it remains a useful working concept. In actual practice, of course, many patients show mixed physical findings of athetosis and spasticity. Clark[11] has made some interesting psychoanalytic formulations in Little's Disease.

No attempt will be made to discuss psychotherapy with cerebral palsied patients except in the most general terms. I should like to remark that paranoid features are very common, and they should not be taken as seriously by the physician as they might be under other circumstances. The patient is capable of a much better understanding of interpersonal relationships than might be at first expected. The feelings which develop between the therapist and the patient are capable of better exploration and movement than is the case with other paranoid patients. The patient often demands social independence when he is not capable of it. Where continued dependency is a necessity, the patient should be helped to an insightful acceptance of it. Psychotherapeutic management of these patients is, of course, vastly simplified in the rehabilitation center.

Summary

Cerebral palsied patients frequently show personality disturbances, and often these are of a paranoid nature. They may take the forms of social withdrawal, fantasy, bizarre goal formation, excessive hostility or attraction toward other individuals, or illogical demands for independence. The general psychological syndrome is discussed. Several cases are presented. It is the opinion of the author that the above paranoid ideation is of an immature quality and that it is not to be regarded as seriously as it might be in a non-palsied setting.

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The Landry-Guillain-Barre-Strohl Syndrome

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This now historically interesting and important neurologic disorder presented under the all inclusive title of "Landry-Guillain-Barre-Strohl Syndrome"[1,2,3] is seen in varying forms and severity such that many anatomical names of similar implication for this rapidly ascending paralytic syndrome came into being. Such names as acute febrile polyneuritis (Osler),[4,5] acute ascending paralysis (Casamajor),[6] polyneuritis with facial diplegia (Taylor and McDonlad),[7] polyneuroradiculitis ascendens (Gaertner),[8] infectious polyneuritis (Roseman and Aring),[9] infective neuronitis (Kennedy),[10] are all terms now quite common in the experience of present day clinicians. Many of us have clinically referred to these cases as encephalo-myelo-radiculo-neuropathy and other combinations denoting the parts of the nervous system predominantly affected in any given case or material examined, my own particular preference being "Acute Symmetrical Post-Infectious Polyneuritis (or Polyneuropathy)" since by all odds the greatest number follow in the wake of an infection. In the absence of known infection, the word "post-infectious" can be omitted and the suspect cause, if there be one, can be placed after the diagnosis. Careful study of Landry's original, now classic article presenting ten cases of ascending paralysis leaves little doubt that these cases belong in the same category as the others above-mentioned. Haymaker and Kernahan,[3] in their splendid clinico-pathologic study of fifty fatal cases of the syndrome under title of "The Landry-Guillain-Barre Syndrome" further point up this relationship. Lewey,[11] in his fine paper, "What is the Guillain-Barre Syndrome?" discussed the controversy over this syndrome that prevailed in the 1920's and '30's, and how, in 1937, Guillain[12] as chairman of a symposium on radiculoneuritis in Brussels, capitulated completely on this syndrome being a specific entity. At this time, he accepted the wide variations seen in this disorder—that it effected cranial nerves as well as the periphery, that it effected children and adults, that the protein content of the cerebrospinal fluid might vary greatly, and that it may be a fatal disorder.

The Landry-Guillain-Barre-Strohl Syndrome then, is not a disease but a symptom-complex which often follows by some days, weeks, or even months an acute febrile illness, usually an upper respiratory infection from which the patient may appear to have recovered. Though it affects old and young, it most often afflicts those in early middle life. Most frequently, there are premonitory symptoms of radicular pains and/or of tingling and numbness in the distal part of the extremities, followed in hours or a few days by a rapidly ascending, flaccid paralysis, most often the lower extremities first, and progressing upward over the trunk to involve the upper extremities, though it may involve all the extremities simultaneously as well. The deep and superficial reflexes disappear as paralysis progresses. The sensory symptoms when present are most evident in the distal parts of the extremities, and to all forms; they are often fleeting and mild, though on occasion may be severe and high into the cervical root segments. Bladder and bowel sphincters are quite frequently involved. Cranial nerve involvement is frequent, the facial nerve being involved in at least a third of all cases, and others may also occur producing the dangerous bulbar paralysis, and this often associated with phrenic paralysis as well. Respiratory problems[13] not infrequently prove fatal. Occasionally papilloedema[14] will develop and persist many months. All of the above symptoms most often progress to their climax in one to three weeks, though slower progress is occasionally seen. The entire course is usually afebrile. The cerebrospinal fluid under normal pressure is clear and colorless, though occasionally faintly xanthochromic, and as a rule will show an elevated total protein, often to very high levels of 1000 to 2000 mg.% (it will however, in the early

course of the disorder occasionally be normal). The cellular content is quite invariably normal, though a slight lymphocytic reaction of 10 to 20 cells may rarely be found and should not preclude the diagnosis (albumino-cytologic dissociation). The sugar and chlorides are also normal in these spinal fluids. Normally, about one-fifth of the cerebrospinal fluid leaves the subarachnoid space via the perineurial sheaths and the cause of the elevated total protein would appear to be related to the swelling and vascular congestion of the nerve roots obstructing the escape of cerebrospinal fluid along these radicular sheaths. The stasis produced and the probable increased flow of plasma protein from the dilated capillaries results in increased total protein in the cerebrospinal fluid in the lumbar thecal space.

Gradual, at times surprisingly rapid, improvement takes place in the ensuing weeks or first few months. This recovery may be complete and without any apparent residual. Recovery from paralysis may however be incomplete and occasionally spasticity of a part will prevail for years. At times too, intermittent root pains may persist for many months. The mortality is low, despite the apparent severity, and ranges from ten to fifteen percent.[15]

The cause of this syndrome is obscure, and though following in the wake of viral and bacterial disease, no such cause has ever been directly attributed, such inferences as "toxic-reactive" being settled upon as an explanation. Allergic response of the patient to the toxin of the infective agent or indeed an allergic response of the patient to his own tissue breakdown might be hypothecated in this interesting tissue reaction. Such may also be reflected in the cases of serum neuritis[16] and those following vaccination.[17] Association of this syndrome with infectious mononucleosis[18] may envisage a toxic-reactive relationship. Observations in cutaneous diphtheria[19] suggests spread of toxin along the perineural channels of the peripheral nerves to the spinal ganglia and central nervous system. This syndrome occurring often much later suggests again a toxic-reactive relationship.

Pathologically, the brain and spinal cord are commonly involved,[20] characterized by mild edema, scattered petechiae and some perivascular infiltration. There may be chromatolysis of the anterior horn cells which may be retrograde in nature. The most marked changes are in the peripheral nerves and spinal nerve roots, often greatest at junctures of anterior and posterior roots, with often severe edema, demyelinization and phagocytic infiltration. The autonomic ganglia and nerves may show edema and round cell infiltrations. The lesions in the cranial nerves and nuclei are similar to those in the peripheral nerves and ganglia elsewhere.

The following three cases are presented as typical examples of this syndrome, one in a boy of 13 months, a second in a 49-year-old practicing physician, and a third in a 58-year-old man:

CASE I: Neurologic consultation: DeF. H., age 13 months, had been in very good health since birth. The birth was a normal delivery. In May 1949, he was vaccinated with moderate reaction. The child was in good health all summer and there had been no exposure to any known illnesses. There was a 28-months old sister who had also been in excellent health throughout the year. Both parents had been and were in very good health.

About noon on October 2, 1949, the mother noted some crankiness and a tendency for the patient to lie on his back and turn from side to side as though he might have pain in his abdomen. The child had had some bananas that were not especially ripe and it was regarded as a possible stomach-ache. His discomfort was especially noted when he lay on his abdomen, less so when he lay on his back. He had, however, taken his food well and appeared comfortable the night of October 2nd and 3rd. On the 4th of October in the evening he was again cranky and restless and was given paregoric which quieted him. Throughout this time, he has not wanted anyone to hold him. October 3 his temperature was 99.4°. Oct. 4 he became very listless, just lays in his crib and whines at times, and whereas he had been creeping, he now makes no effort to move his extremities to any extent. There has been no rash; bladder has functioned regularly, and bowels have moved regularly.

Physically, a very well developed and nourished 13-months old child, lying on his back, spread-eagle fashion, not appearing acutely ill, but whining and restless. Temperature, 99°, pulse and respirations normal. Heart, lungs, and abdomen appeared negative. Spine negative. Head negative. No bruises. Percussion note normal.

Neurologically, the child looks listlessly at those about him ,cries easily during the course of the examination. He suckles well and swallows well when lying down, but appeared to have some difficulty

when sitting up with support. The child is not able to sit up unsupported and when picked up and held up, he squirms restlessly to be put down. But during the act of squirming, he does not use his arms in a natural manner, there being a failure to push, clutch with his arms, or grasp with his fingers, and whereas he pumps his legs, there was limited strength in the feet, ankles, and legs at the knee, the thighs showing moderately good strength. No deep reflexes could be elicited. Plantar irritation produced withdrawal and equivocal responses. Abdominal reflexes were greatly diminished, only a flicker being present. Sensation to vibratory sense appeared to register a response in the distal parts of all the extremities and pin-prick sensibility appeared normal. Cranial nerves: The child appears to see well, pupils were equal and reacted promptly to light. Ocular fundi showed sharply circumscribed discs, normal vessels, and normal maculae. Extra-ocular movements were complete, no nystagmus. Palpebral fissures were equal. There was some facial immobility, though the face took on rather complete coordinative movements in crying, and he suckled well. We did, however, question some flatness in the left side of the face. Sensation about the face appeared normal. Hearing appeared normal. It should also be added that there did not appear to be any muscle tenderness in the skeletal or spinal musculature.

Diagnosis: This child, with this history and the present findings poses a definite problem of differential diagnosis. At the end of the polio season, presenting as this child has, one naturally tends to a diagnosis of "missed polio" with now mild, rather symmetrical paresis of the extremities. The universality however of the picture is against this, and a more diffuse, less penetrating infection would be more suspect, possibly more polyneuritic, and/or encephalomyelitic in nature. Certainly there are no signs of a strictly focal nature in his examination today.

Recommendations: Would urge observing the child for the next day or two, during which time a spinal puncture and other laboratory data can be obtained.

Progress note, October 7, 1949: Spinal puncture performed without difficulty and 5 c.c of clear and colorless fluid was obtained. Analysis showed no cells, 76 mg. % of total protein, thus the patient's total protein is considerably elevated. His neurological examination remains unchanged.

Progress note, October 21, 1949: Spinal puncture performed without difficulty and 5 c.c. of clear and colorless fluid was obtained. Analysis showed one white cell, and 96 mg. % of total protein. Thus it is apparent that there has been a progressive increase in the spinal fluid protein. This, with the over-all clinical picture as it has been observed each day, with its varying degrees of weakness in all extremities, listlessness, areflexia, slight flatness of the left side of the face, and on several occasions a hypalgesic response to pain over the feet and legs, place this case squarely in the encephalomyelo-radiculo-neurotis group with the usual associated albumino-cytologic dissociation of the Guillain-Barre Syndrome. At the present time, the child is showing some improvement in general strength and general behavior, and tries to roll over to one or another side.

Progress note, October 25, 1949: The child's progress has been gradually better this past several days. He is more friendly, does not whine, can turn from side to side, and has been much more alert to what is going on about him. Today he willingly came to the examiner's arms, clutched at his shoulders, was able to push up with his feet, but definitely better with his left leg than his right. The right thigh evidences definite weakness in the iliopsoas and quadriceps group, as well as some weakness in his hamstring group. There is slight weakness remaining also in his entire right extremity, notably in the grasp of the right hand. He continues to show an areflexia but good plantar flexion is present. He sits up very well and played in an interested manner with the various examination instruments smiling and jabbering at times. There was no muscle soreness in evidence; there was slight reduction in the size of the right calf in comparison with the left. No sensory signs in evidence. The pupils were equal, reacted well, the fundi normal, and the cranial nerves otherwise negative. It is recommended that the patient be retained in the hospital for about another week under the present supportive program.

Final Diagnosis: Encephalo-myelo-radiculo-neuritis, acute, moderate in degree, with regression. (Guillain-Barre Syndrome.)

Follow-up, Sept. 19, 1950: The child has grown well, walks well, and is talking nicely now. Examination disclosed symmetrical development. Cranial nerves and fundi were normal. Strength was good. Reflexes were active and equal. Plantar flexion was good. Legs were symmetrical and each measured 19 cm. at a point 4 cm. below the tibial tubercle. Sensation was normal throughout.

Follow-up from his pediatrician, September 18, 1955: The youngster is now seven years old, 51 inches tall, and weighs 53 pounds. He is rather slight and slender for his age, and somewhat sentitive and high strung. There are no sequelae evident from his past illness. His reflexes are normal as are his other neurological tests."

CASE II: Dr. E.R.S., physician, age 50: This patient, previously well, developed a severe sore throat and grippal reaction on May 4, 1949. Initially self-treated with penicillin and bedrest, he improved. About one week later, he developed severe pains in the right sciatic nerve distribution and by May 12th, he was aware of numbness and pains in his feet and fingers. This was variable and associated with much tingling. On May 15th, he also developed diplopia.

Seen for the first time in neurological consultation on May 16, 1949, he presented a picture of a physically moderately well developed and nourished man of asthenic build, afebrile. Ears, nose,

and throat were negative. Pulse 80, blood pressure 105/78. Heart, lungs, and abdomen were negative. No adenopathy.

Neurological examination revealed some weakness in his legs, general in nature, marked tenderness over the right sciatic trunk, markedly diminished ankle jerks and some hyperalgesia over the toes of the right foot. Cranial nerves showed a right abducens weakness with diplopia. Examination was otherwise normal.

He deferred hospitalization and when seen again on May 19, 1949, he reported a mild right orbital headache, pains in his shoulders and legs, general weakness greater, and the diplopia had persisted. He showed a right sixth palsy and slight flatness over the left side of his face, weakness in both grips, markedly diminished reflexes in the right arm. He was unable to stand, weakness being present in the iliopsoas, quadriceps group, and extensors of the feet, (right more than the left), and all leg reflexes absent. Abdominal reflexes were active. Diaphragm normal. Sensation in the feet was diminished to pinprick. There was tenderness of the right sciatic nerve.

Patient was admitted promptly to the hospital where spinal puncture revealed a normal pressure, clear fluid, no cells, and a total protein of 287 mg.%. During the ensuing week, he developed bilateral facial paralysis and weakness in the jaw musculature, retained abducens palsy, and he showed severe weakness in both legs. Arms were usable but weak. His cerebration was often confused and his nights were filled with frightening nightmares necessitatting sedation.

A second spinal puncture one week after admission showed a clear fluid, with no cells and a total protein of 425 mg. %. This status prevailed for the next three weeks and gradually cerebration cleared, and strength was manifestly returning in affected cranial nerves. The extremities too began showing slight improvement. Radicular pains in his shoulders and into the right leg continued to plague him. By early July, he was able to assist himself to a wheelchair, and progress was steady henceforth. On August 15, 1949, he was discharged to his own care at his summer home where he could swim daily.

Re-examination on October 1, 1949, showed him to be feeling, and looking very well. His strength was good, but he was tiring easily, aching on occasion. Cranial nerves and fundi were normal. Reflexes had all returned and sensation was normal. He returned to full office duties on November 1, 1949, and remained in good health thereafter with no sequleae in evidence.

CASE III: C. T., male, age 58 years, was seen in neurological consultation on March 30, 1955: History obtained from the patient's wife and family indicated that he was in moderately good general health until about mid-February 1955, at which time he came down with a very bad cold which hung on and took a lot out of him such that early in March he went to his local physician because though having gotten over the cold, he was very weak and wanted something to pick himself up. The doctor found a high blood pressure (180/?) for which he ordered some Raudixin and gave him some B_1 which he took for a week or so, and then stopped it. Feeling fairly good, he kept up moderate general activity and went fishing rather frequently with members of his family. On March 20th, he complained of feeling unusually distressed and weak and finally took an enema even though he had had a bowel movement earlier in the day. During the evacuation of this enema, he called for help, vomited forcibly and in quantity, and seemed very weak and pale, "falling over upon me when I went to help him" his wife stated. He felt somewhat better the next day and fished on March 21st, 22nd, and 23rd, apparently feeling fairly well. On 24th of March, he went fishing about 1:00 p.m., and complained bitterly of his hands hurting him all of the time. Later in the day he remarked that if he landed a fish, he could not reel it in because he was feeling so weak in his hands and arms. When driving home, he turned the wheel over to his wife because his hands hurt so much and he was feeling weak all over. On the 25th, the pain in his hands disappeared and numbness supervened in his feet, extending to the elbows and the knees. Later that day, he had difficulty in urinating. On the 26th all of these symptoms worsened and he had to be helped to walk from the bathroom in the morning, and has not walked since. Additionally, he had marked difficulty in urinating. His condition became generally weaker and his physician advised his transfer to Jacksonville on March 27th, 1955.

The patient's habits have been essentially good, he used tobacco moderately, little alcohol, and had good eating habits. He had not been exposed to any unusual poisons, inoculations, injuries or deep scratches. He had not been about dogs or other animals, nor exposed to any unusual disease. A year and a half ago he had a complete physical examination at Duke University, where though he had some slowing of his urinary stream, they advised against any surgery at the time.

Physically he was a well developed and nourished man, apparently about stated age of 58 years, and in a Drinker Respirator. Color good. Temperature 100°; pulse 85, good quality, regular; blood pressure statedly 120/80. No peripheral or facial edema. There was some grey mucous discharge in his nostrils. Foley catheter was in place.

Neurological examination: The patient was conscious, oriented, and cooperative. Voice was clear. Speech coherent and he enunciated quite clearly in rhythm with the respirator. Vision was good in either eye. Pupils were 2 mm., equal, and reacted promptly to light and accommodation. Extra-ocular movements were complete, no nystagmus. Ocular fundi showed normal nerveheads, vessels, and retinae. There was no ptosis nor palsy of the facial, masseter, palatal, or tongue musculature though it has been stated that earlier he seemed to have some difficulty in swallowing water. Hearing was good in either ear. There was no disorder of sensation of the cornea nor about the face.

There was a flaccid paralysis of all four extremities and body musculature, such that he was quite unable to spontaneously draw a breath, and when the door was open on the respirator he could not verbally express himself, indicating that he could not fix his diaghragm either. The deep reflexes were statedly all absent and this examiner did not attempt to repeat them at this time. There was tenderness within the muscle mass of the calves and forearms especially. There was a feathered hypalgesia and hypesthesia over the feet and legs of the knee and over the hands and arms to the elbows. Position sense was intact in the toes and fingers. He was unable to move his feet or legs, fingers, or arms, though there was slight movement in effort to shrug shoulders.

Laboratory data showed a normal red count, 12,000 WBC with 90% polys (which goes along with the recent temperature rise, and I believe related to systemic factors rather than to the sensory motor illness). Blood sugar, 184 mgms. % (taken near glucose infusion or does it bear investigation?). Urine negative. Spinal fluid clear, no cells, 35 mg. % total protein.

Differential considerations were acute viral infection, tick paralysis, metallic and spray intoxications, poliomyelitis, Landry's Paralysis, and Guillain-Barre Syndrome.

Diagnosis: Acute, Symmetrical Post-Infectious Polyneuritis (Guillain-Barre Syndrome). The specific etiologic factors concerned in this disorder are unknown but auto-allergic reactions of the central nervous system and peripheral nerves is believed by some to exist in this disorder, and from the various and differing circumstances under which we find this derangement, I believe this is a very possible factor in the production of this acute, symmetrical polyneuritis. Some have felt that it is part and parcel of the viral infection but no viral organisms have ever been obtained in any cases, and it has been studied quite fully in our best viral laboratories. It is not rare for it to follow diphtheritic infection and has been seen after tetanus antitoxin, etc. Our particular case has, to my mind, followed a classic course of pre-existing viral infection, asthenia, and then polyneuritis. A normal total protein in the spinal fluid in the early phase of this disease is not uncommon and indeed, on occasion it may not rise to very high levels at all.

Recommendations: 1. The patient may be removed from contagious precautions.

2. Intensive supportive regimen must be maintained and advisedly include a plastic Levin or other stomach tube for hourly feedings: Sustagen, one part Sustagen to 3 parts water and use 3 quarts in 24 hours. Add 1 dram of Stewart's "Theron" to this mixture daily. This we have found to be a good all-around supportive food mixture.

3. Combat systemic infection with anti-biotics.

4. The use of ACTH I believe, has an excellent supportive place in this treatment program, and in some instances I believe it has turned the tide of the course of the illness. I have used 25 units in 1000 c.c. of normal saline, dripped over a period of several hours, and more recently I have used it in the form of Acthar-Gel, intramuscularly. Exactly what dose may be adequate I am unsure, but I have used 40 Units of Acthar-Gel per day for the first three days and then every other day for 3 or 4 doses to advantage. When used intravenously, the smaller dose was used. The amount of Acthar-Gel suggested here should have very little contraindication from the general somatic standpoint. If one were to use more, I believe that the same contraindications should be kept in mind as in the use of ACTH under other circumstances.

5. Additionally, and/or as an alternate, we have used 10 c.c. of Eschatin intravenously twice daily for 3 or 4 days and later have used 5 c.c. intramuscularly daily for an additional 5 or 6 days with what has always appeared to me to be real supportive effect, and I suggest it again in this case.

6. Respirator support must be maintained and a tracheotomy may be necessary to maintain adequate airway.

7. Physiotherapy along same lines as for poliomyelitis should be instituted as soon as out of the critical phase.

Prognostically, the odds of improvement I believe are with us though the age of the patient in this instance must be kept in mind. But statistically, about 70% of these cases do well or moderately well and are once again able to get about at least in fair fashion. The critical phase is now and the next 2 or 3 weeks, after which we should see stabilization and improvement if that be the course in this instance. By and large these patients die early in the disease if they are not going to pull through.

Follow-up revealed that this patient showed gratifying response overnight and within the next 36 hours his condition was no longer critical from the vital standpoint. His progress was steady improvement thereafter. He came out of the respirator in the next ten days and physiotherapy was regularly administered. His present status reveals he has the use of all muscle groups, walks with slight assistance, uses his hands and arms well, though full strength has not returned. It is anticipated that his progress will continue since it has been so steady thus far, and he has lost no specific functions.

Treatment of these cases brings up the important fact that in the absence of a known etiology, all care must be entirely supportive, nutritionally and vitally, as outlined in Case III. Cases suffering respiratory embarrassment must not be temporized with, and a respirator should be in readiness and utilized before the patient exhausts himself. A tracheotomy performed when the disease is rapidly advancing during the first week or two may be life saving. The use of corticotropin (ACTH) as a supportive measure, has, in my opinion, changed the course of

the illness during the early critical phase of the illness, as you will note in Case III. The author first used corticotropin in two consecutive very ill cases with cranial nerve and massive peripheral involvement, in the spring of 1953. ACTH, 25 units, via intravenous drip daily, provoked change for the better in the first 24 hours and gradual improvement through the ensuing week, when the ACTH was tapered off. One of the cases relapsed quite severely in about 5 weeks but retreatment again proved supportive and the patient then continued on to a good recovery as did the first, with of course, all other nutritionally supportive measures. Since then, the author has used Acthar-Gel instead of the intravenous route with equally good results. The response to ACTH rather supports the allergic hypothesis of causation in these cases.

The author has not used cortisone in these cases; it has been used however with variable results. Drenick[21] recently reported favorably on its use in two cases and urged further clinical trial. Essellier and Kopp[22] reported nine cases treated with ACTH last year and felt the hormone was definitely indicated in the grave, rapidly progressing cases, and was also advisable in the mild but slowly progressing cases.

Summary

1. The name Landry-Guillain-Barre-Strohl Syndrome is an acceptable term from historical standpoint only. The names are however popular and bear retaining as a general heading for the various forms of polyradiculopathy of unknown etiology as described in the above cases.

2. Three classical cases of this syndrome are presented ranging in age from 13 months to 58 years, indicating again the wide age range of this affection.

3. It is suggested that the causation of this symptom-complex may be allergic in nature and the response to corticotropin further supports this hypothesis.

4. The use of corticotropin is very valuable in the acute critical phase of this syndrome and should be used in addition to other supportive measures.

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Infantile Hemiplegia With Intractable Seizures

(Treatment by Hemispherectomy)

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Krynauw first performed hemispherectomy for infantile hemiplegia with convulsions.[1] Not only were seizures reduced or eliminated, but there was also improvement in intellect, voluntary motion, and in speech even when the left hemisphere was removed. Cairns, Alcalde, and McKissock separately reported similar findings.[2,3,6] Although results seem worth while and almost uniformly good, the indications are not entirely clear. The operation obviously is ideal in the case of uncontrolled seizures where one hemisphere is normal and the other is completely atrophic, provided seizures are uncontrolled with medication. It is probable that there is also justification where there is mental deterioration or extreme spasticity, even when the seizures are fairly well controlled. Electroencephalography in such an instance should indicate that convulsive activity is coming from the atrophic side. Results from cortical resection of the non-atrophic side in our fourth case would indicate the value of electroencephalography and that at least occasionally the atrophic hemisphere may not be the site of origin of seizures and disability.

Although reports would indicate that there are no psychological disturbances following hemispherectomy of a non-functioning hemisphere, this is certainly not true where atrophy is not complete and where there is some function of the atrophic side. This is mentioned in the report by Mensh, Schwartz, Matarazzo, and Matarazzo.[4] It is also well illustrated in our second case. Disturbance or improvement of motor function apparently runs a similar parallel. The greatest problem with respect to indications would seem to be in those cases with partial atrophy and with the determination of the need for hemispherectomy, subtotal or complete lobectomy, partial lobectomy, or cortical excision.

The findings of history, examination, electroencephalography, and pneumoencephalography must be carefully weighed, and considerably more cases reviewed before mature criteria can be set up.

Technique. I have used a flap, including all of the parietal bone to the midline, the temporal, and approximately half of the frontal area. To reduce blood supply in the hemisphere, the Sylvian fissure is first opened and a clip placed on the middle cerebral artery just proximal to the trifurcation. Sufficient parasagittal veins are then coagulated and cut in the frontal area to allow lateral retraction of the frontal lobe. It has been easier to coagulate and cut branches of the anterior cerebral artery entering the frontal lobe near the corpus callosum than to clip the anterior cerebral artery. The entire corpus then is incised down to the ventricle and the incision carried posteriorly where the posterior cerebral artery can be clipped or coagulated and out. Incision is then carried laterally around the caudate nucleus, approximately through the claustrum, across the temporal horn of the ven-

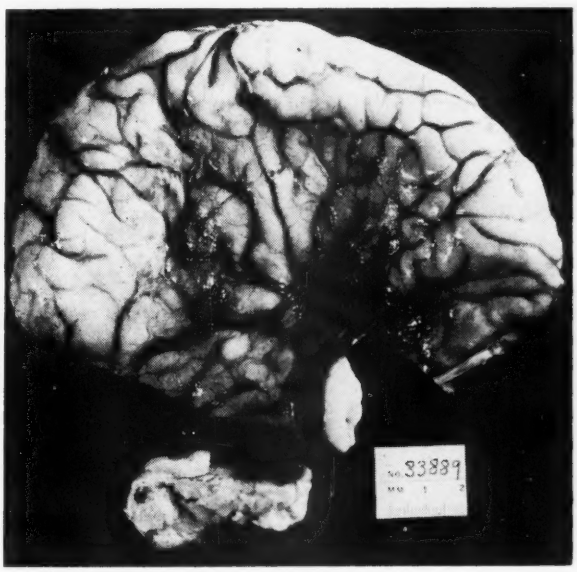

Fig. 1. Case 3. Hemispherectomy specimen where atrophy is marked.

From the Division of Neurosurgery, Methodist Hospital and Baylor University College of Medicine.

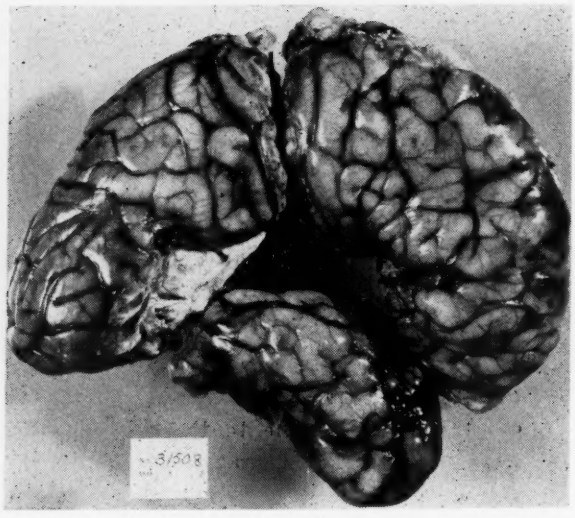

Fig. 2. Case 1. Hemispherectomy by sections where atrophy is moderate.

tricle, and through the temporal cortex, sparing for the moment the hippocampal gyrus. (Fig. 1.) This can be removed separately and was done in our three cases because of marked electroencephalographic activity. If atrophy is not marked, removal of the hemisphere in sections may facilitate the procedure, the frontal lobe being removed first, then the parietal with the occipital, and finally the temporal. (Fig. 2.) The upright position was used in the third case and this seemed to offer some advantage. Hypotensive anesthesia has not been used.

Summary of the Cases

Case No. 1: H. E., a boy aged 14 years, was normal until at the age of three he fell on a stick which pierced his neck, producing fever that persisted for several days. On the fifth day, he developed a complete left-sided hemiparesis. His first generalized seizure was four years later, and his first focal seizure was at the age of eleven. In spite of medication, seizures rapidly increased in frequency and, because of an I. Q. of 60, institutionalization was considered necessary. The right hemisphere was removed February 25, 1954. (Fig. 2.) He did well following surgery except for stupor and blood collection in the right cranial cavity. This was not relieved by repeated taps and drainage, and on two occasions the cavity was slowly irrigated with 1,000 cc. of saline solution, introduced through a frontal needle, with drainage from a second dependent needle in the occipital area. At the time of discharge from the hospital, seven weeks after surgery, it was felt that he was greatly improved. Except for several seizures during the immediate postoperative period, there were no attacks. An electroencephalogram three months after surgery showed a minor focus in the left frontal lobe, but was otherwise negative. Four months after surgery, he developed signs of increased intracranial pressure and exploration through a small opening revealed a completely occluded aqueduct. He expired exactly five months following surgery, with marked hydrocephalus of the left hemisphere, occlusion of the aqueduct, and obliteration of the basal cisterns.

Case No. 2: P. C., a female, age 13, developed jacksonian seizures in the left hand at the age of three years. These were relieved temporarily by local cortical excision at five years of age, and again at seven years of age. The right side of the skull was smaller than the left, but moderate ventricular

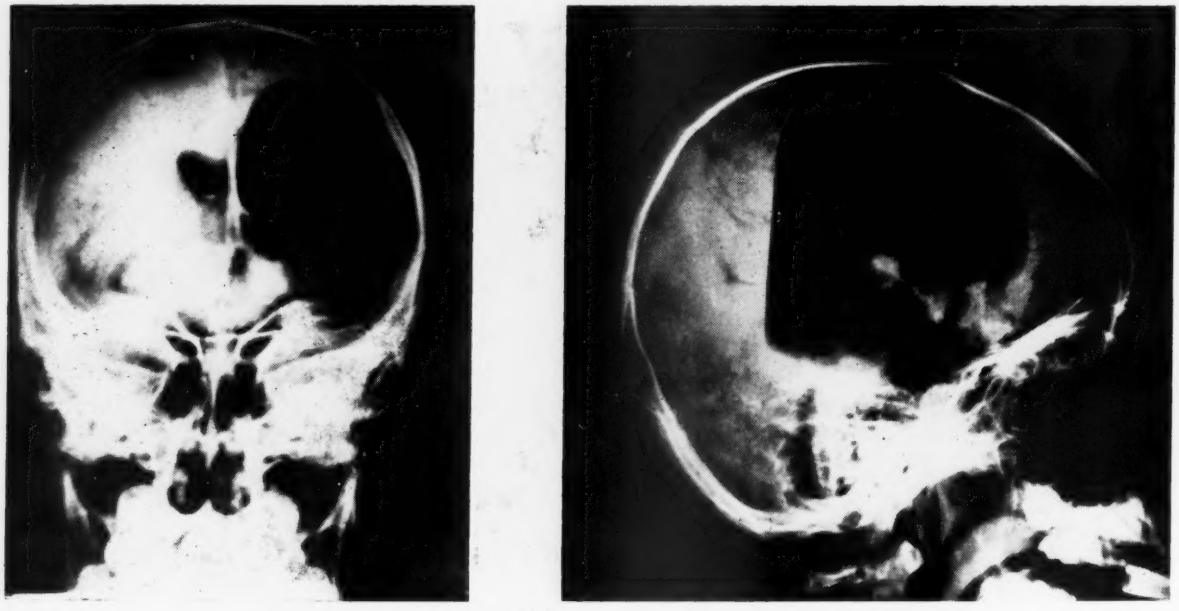

Fig. 3. Case 3. Right hemiatrophy with fairly normal left hemisphere.

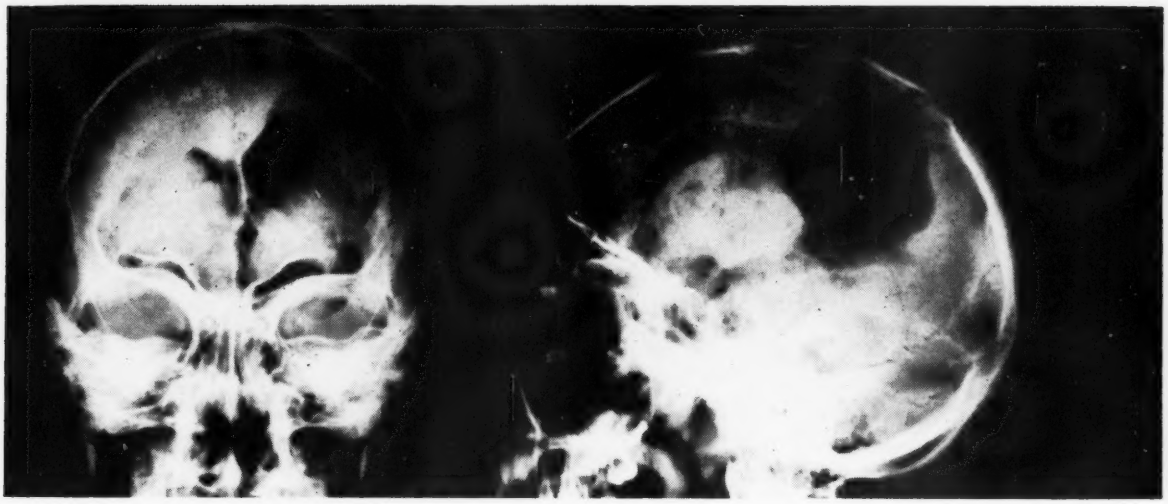

Fig. 4. Case 4. No hemispherectomy because of normal EEG on atrophic side. Excellent result from cortical resection of epileptogenic foci in left cortex.

dilatation was about equal bilaterally. Hemispherectomy was selected because of failure of two previous surgical procedures. Although her postoperative condition was excellent and there was no excessive blood collection in the cavity, she developed a severe negativistic, almost psychotic, attitude following surgery, which was an exaggeration of her pre-operative condition. Speech was monosyllabic with frequent cries of "mama." Hemiplegia which was moderate before surgery was now profound, but without marked spasticity. She slowly improved and her personality developed as if she were relearning from childhood. She strung beads, remembered TV stories in detail, and eventually mentality returned close to normal. Electroencephalography following surgery was entirely normal and she had no seizures.

Case No. 3: H. J. D., a nine-year-old girl, developed a complete left hemiparesis following a febrile episode at twenty-one months. She had innumerable uncontrolled jacksonian and generalized seizures, with a cortical scar being removed on the right side about a year after onset of seizures. This child was bed-ridden, speechless, and had to be spoon fed, but was able to follow persons with her eyes and appeared alert. Pneumoencephalography showed complete atrophy of the right hemisphere (Fig. 3) and electroencephalography showed marked depression over the right hemisphere and continuous diffuse slow and sharp waves on the left. Following hemispherectomy (Fig. 1), collection of bloody fluid in the cavity could not be entirely relieved by drainage and taps, and three weeks following surgery the cavity was completely cleaned out of several old clots which apparently were continuing to break down and discharge blood pigment into the intradural space. Two months after surgery, spasticity which had been present bilaterally was minimal on the left side only, and she was able to feed herself clumsily. She had had two minor seizures about a month following surgery and an electroencephalogram on the left side was markedly improved over the preoperative findings. She is now able to sit alone and is starting to walk.

Case No. 4. Cortical resection on non-atrophic side: J.S., an eleven-year-old boy, was born with right hemiparesis, marked spastic paralysis of the right hand, severe speech defect, and mental retardation. He had not advanced beyond the second grade at school and concentration was so poor that little progress was made under a special tutor. Seizures, occurring shortly after birth, had disappeared until approximately one year before the time of examination, at which time they had become increasingly severe. An electroencephalogram surprisingly showed considerable epileptogenic activity over the supposedly unaffected right hemisphere with almost normal activity on the left. Pneumoencephalography revealed marked atrophy on the left with porencephaly (Fig. 4). There was no response to anticonvulsive therapy and the right hemisphere was explored three and a half months later. The examination of the cortex revealed considerable microgyria, and electrocorticography disclosed two very active foci, one in the posterior temporal region and the other near the angular gyrus, slightly higher, both of which were removed.

With the aid of anticonvulsants, there have been no seizures in over two years. His parents reveal that he reads constantly and is doing very well in school. The electroencephalogram several months after surgery was almost normal, but a spike focus appeared on the right side ten months after surgery.

Except for electroencephalographic absence of convulsive activity on the atrophic side of the brain, this case might have been considered a candidate for hemispherectomy.

Discussion

It appears to me that there are yet many problems unsolved as to indications for hemispherectomy, technique of operation, and postoperative management. It may well be

that experiences with this procedure will lead to new knowledge of brain function. What degree of cerebral atrophy and electroencephalographic findings would lead one to choose hemispherectomy instead of lobectomy or partial lobectomy? In the absence of significant atrophy, what are the indications for hemispherectomy? What degree of damage to the good side of the brain should be considered a contraindication to the operation? In cases where there is some persisting function in the damaged side, can psychological changes be overcome regardless of the age at which the operation is done? Is the operation indicated if hemiplegia developed late? What is the best way of managing the bloody effusion into the cavity left by removal of the hemisphere? When these and other questions are answered, this promising procedure should find its place among useful surgical operations.

Conclusions

Three cases of infantile hemiplegia with intractable convulsions, treated by hemispherectomy, have been reported. A fourth case in which equally good results were obtained by local cortical excision of epileptogenic foci on the non-atrophic side is presented. A need for crystallization of the indications, technique, and postoperative management of these cases is emphasized.

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Effects of Reserpine Therapy on Funkenstein Test Reactions in Maladapting Patients

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Introduction

In 1949, Funkenstein and his colleagues described the reaction of the systolic blood pressure following the administration of adrenalin and of mecholyl in patients with mental illnesses and in normal individuals. These reactions in the mentally ill, or maladapting patients were of several kinds. Specific patterns of response were found by Funkenstein to be correlated with the success or failure of electroshock treatment, and effective treatment tended to be accompanied by changes to the normal patterns of blood pressure response to these drugs in individual patients.[1,2,3,4,5]

Alexander[6] and Gellhorn[7] contributed confirmatory data of clinical and experimental origin.

Schneider[8] recently reported changes in the reaction to mecholyl immediately following the administration of the drug reserpine in a group of non-psychiatric patients. This paper reports changes in reactions to the Funkenstein test occurring during and following the course of reserpine therapy in a small group of maladapting patients.

Materials and Methods

Selection of patients for this study was not made on the basis of diagnosis or criteria other than that the individuals were out-patients of the Creedmoor Institute who had received Funkenstein testing prior to reserpine administration. The four patients reported upon are those of an original group of six who were available for later repeated testing.

The administration of the test followed the method described by Funkenstein. Pa-

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tients were given an explanation of the procedure and reassured. They then were allowed to rest in bed until a basal level of systolic blood pressure was determined. Adrenalin (0.025 mg. in 2.5 cc. of water) was then administered intravenously, and the systolic pressure recorded at four-minute intervals until it was again stabilized at the basal level. Mecholyl (10 mg. in 2 cc. of water) was then given intramuscularly, and the systolic pressure again observed at four-minute intervals until stabilized.

The time relations between the Funkenstein tests and reserpine administration in each patient are furnished by Table I:

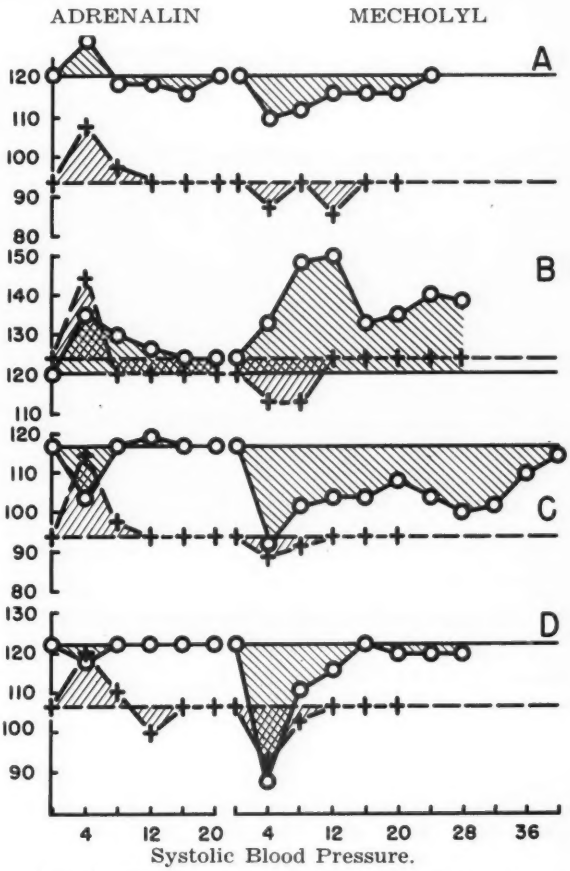
TABLE I

Patient	Days of Observation	Event	Daily Dosage of Reserpine
A	0	Test No. 1	——
	1	Began reserpine	3 mg.
	104	Test No. 2	3 mg.
B	0	Test No. 1	——
	1	Began reserpine	1 mg.
	72	Test No. 2	1.5 mg.
C	0	Test No. 1	——
	20	Began reserpine	3 mg.
	64	Test No. 2	2 mg.
	180	Test No. 3	1 mg.
D	0	Test No. 1	——
	58	Began reserpine	3 mg.
	87	Test No. 2	3 mg.
	204	Stopped reserpine	——
	240	Test No. 3	——

Results

The results of the original and the first repeated Funkenstein tests of each patient are depicted in Figure 1. Summaries of the patients' case records and the results of Funkenstein testing are as follows:

Patient A was a 45-year old single white Jewish male, with a diagnosis of simple schizophrenia. The onset of the illness was at the age of 20, and shortly thereafter he was hospitalized for one year in a state hospital. He then left the hospital and supported himself until the age of 38, when he attempted to kill himself and was again hospitalized briefly. For four years prior to the time of this study, he was an out-patient of the Creedmoor Institute, receiving a variety of somatic treatments and psychotherapy. To none of these did he respond fully. Since the completion of this study, this patient has taken his own life.



Systolic Blood Pressure.
Pre-therapy o——o. During therapy +—+.

His response to reserpine therapy was minimal. He reported that he was "more relaxed, worrying less," and noticed better sleep and an increased appetite, resulting in a weight gain of fifteen pounds. He exhibited no side-effects from the medication.

On the original Funkenstein test, the patient exhibited the usual schizophrenic patterns of minimal adrenalin response combined with a prolonged systolic pressure fall following mecholyl administration. On the repeat testing, the resting systolic pressure was 26 mm. lower, demonstrating the usual hypotensive effect of reserpine. His adrenalin response was then greater and more prolonged, and the reaction to mecholyl was of less intensity and duration.

Patient B was a white Jewish male of 15 years of age. This patient had an illness diagnosed as a staphylococcal meningo-encephalomyelitis at the age of four, following which there were strabismus and right sided diminution in associated movements.

Throughout childhood this patient was of dull intelligence, seclusive, and a behavior problem. For these reasons he had been an out-patient of the Creedmoor Institute for three years before the onset of the present study. At that time the presumptive diagnosis was post-encephalitic psychosis. However, six months before he was placed on reserpine therapy he underwent a dramatic and acute schizophrenic episode, of paranoid type. Following this he had been placed on chlorpromazine treatment for two months, without effect. This patient has since been hospitalized.

Immediately after the original Funkenstein test the patient was placed on reserpine therapy. The original dosage of 1 mg. daily was increased to 3 mg. later, but, by the time of the second Funkenstein test, had been reduced to 1.5 mg. daily because of somnolence. The patient gained thirty pounds in weight, becoming obese. Other than the somnolence the drug had no apparent effect on his mental condition.

The original Funkenstein responses of this patient were a moderate rise of systolic pressure after adrenalin administration, and a paradoxical rise of moderate extent and duration after mecholyl. His basal systolic level was not lowered by reserpine therapy, but was rather slightly elevated. On the repeat testing, there was found to be a conversion of the reactions to both drugs to the normal pattern of a moderate rise after adrenalin, and a brief and mild fall of the systolic blood pressure after mecholyl.

Patient C was a 38-year-old white Roman Catholic housewife, of Polish ancestry. She had suffered since early adolescence from severe anxiety attacks, a multitude of phobias, and severe nightmares of bizarre nature. Before seeking help, she had not left her home alone for seven years, because of her many fears. Her diagnosis is pseudoneurotic schizophrenia.

This patient exhibited a remarkable response to reserpine therapy. Her anxiety attacks, phobias, and nightmares ceased, and she was able to respond well to psychotherapy. Gradually, she became able largely to establish a normal pattern of living. Following a seven-month period of drug therapy combined with weekly therapeutic interviews, she became able to maintain her improvement without the aid of reserpine. Early side-effects of reserpine in this patient were severe nasal congestion, somnolence, massive bilateral breast engorgement without lactation, bulimia with a moderate weight gain, and a complete loss of sexual desire. All these symptoms disappeared during the first three months of reserpine therapy with the exception of the sexual frigidity, which persisted until the cessation of reserpine treatment, and then underwent remission.

Her original Funkenstein reaction pattern was one of paradoxical fall after adrenalin and extreme and prolonged fall after mecholyl. On the first repeated testing, 44 days after the initiation of reserpine treatment and following her mental improvement, there was a 22 mm lowering of the basal systolic level, and a conversion of the test reactions to those seen in normal persons, a moderate rise following adrenalin administration and a brief and minimal fall following mecholyl. The third Funkenstein testing, after over five months of reserpine therapy, almost exactly paralleled the results of the second testing.

Patient D was a white Jewish housewife, 36 years of age, who was seen at the Institute in connection with the case of her son, eight years of age, who exhibited a behavior disorder. This mother was a severe psychoneurotic with many obsessive-compulsive features. Her family and social adjustments were poor, and there was an underlying homosexual conflict which gave rise to much anxiety. She was given reserpine for five months in order to allay this anxiety and to make her more accessible to psychotherapy.

The response of this patient to reserpine was moderate. Her anxiety was lessened considerably, and because of this more satisfactory relations with her family were possible. This accomplished our primary purpose of aiding her son to resolve his own problems without recourse to unacceptable behavior. The patient appeared to maintain her improvement after the cessation of reserpine therapy. Moderate nasal congestion and a mild increase in appetite with a ten-pound weight gain were observed during reserpine administration.

This patient's original Funkenstein reaction pattern was, like that of Patient C, that seen in most schizophrenic patients, and consisted of minimal adrenalin response and marked and prolonged mecholyl response. After a month of reserpine therapy, the second testing showed a conversion to the normal pattern of moderate adrenalin response and mild and brief response to mecholyl. One month after the discontinuance of reserpine, the patient exhibited a Funkenstein response pattern similar to that originally shown. The basal systolic level had risen to 118 mm., there was again a slight paradoxical fall after adrenalin, and there was a 22 mm fall in pressure requiring 16 minutes for return to the basal level after mecholyl administration.

Discussion

In three of the four patients, reserpine therapy had the expected effect of lowering the resting systolic blood pressure. In Patient B, one with probable neural tissue damage and who exhibited an unusual rise in systolic pressure following mecholyl, the systolic level was found to be elevated slightly after reserpine administration.

In all patients, the Funkenstein reaction pattern during reserpine treatment was changed markedly, in each case toward the normal pattern. This alteration was not correlated with the clinical effects produced by the medication, and was as marked in Patient B, who seemed to respond not at all to reserpine, as in Patient C, whose improvement on the drug therapy was remarkable. Recent observations in an intramural population suggest that the effectiveness of reserpine in changing clinical aspects of chronic schizophrenic disorder (distinct from blood-vascular reactivity per se) depends upon a time-dosage factor, which was not reached in the patients described in this report.

There is an unusual similarity of the Funkenstein reaction patterns of Patients C and D, who responded best to the drug. Each showed a pre-reserpine pattern of minimal adrenalin response and marked and prolonged response to mecholyl. During reserpine administration, the pattern of each was changed markedly, with the appearance of much greater response to adrenalin and moderation and shortening of the mecholyl response.

It is noteworthy that, in each of these patients, the changes in response to the drugs and the lowering of systolic blood pressure levels by the hypotensive effect of reserpine so coincided as to cause the maximal blood pressure rise after adrenalin administration and the minimal fall following the injection of mecholyl to reach approximately the same levels in each instance, the greatest difference in these points being within a 4 mm range.

Summary

Funkenstein test findings in four psychiatric out-patients before and during reserpine therapy are presented. All of the patients exhibited abnormal adrenalin-mecholyl reaction patterns prior to the onset of therapy. In each case, testing during therapy revealed a conversion of the Funkenstein reaction pattern to one closely resembling that found in normal individuals. This change had no relation to the clinical effects of the drug in the small group reported.

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Response to Wonder Drugs...

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In the evaluation of the effectiveness of any new drug, one must consider the psychological as well as the pharmacological and physiological effects of the administration of that drug. It is a well known fact that mentally ill patients will often respond favorably to increased attention and interest in them by those who are treating them.

A somewhat baffling situation is created by the frequency with which new drugs, methods, or treatment for emotional and mental illness are introduced into the field of psychiatry, with early reports of outstanding success which may be sustained for a period of time and then followed by dwindling enthusiasm for that drug. In this paper we would propose an hypothesis concerning the psychological component of such a response in the field of new drugs.

Psychiatric articles and informational stories, passed mainly by word of mouth, often date the starting of improvement to some special attention given to the patient by the psychiatrist or the nurse. Even back in the days of Charcot a patient's improvement was attributed to Charcot's taking his silk pocket handkerchief and wiping the nose of a stuporous catatonic patient. In like manner when the fad of spinal fluid drainage held sway, it was quite accurately ascertained that many outstanding cures which had originally been attributed to the drainage were in reality responses based on the fact that in this process many chronic backward patients received special attention and interest.

As an investigator starts with a new drug which may have great possibilities, it would seem quite natural that lurking in the back of his mind would be the thought, "*This* may be the answer." Not only is it a cultural characteristic but it is a trait coming down through the ages that man has been looking for finality in every field of science; so with each new drug would come the wish that it might prove the "solution to everything." With this sort of a mental set-up, our investigator might then quite readily displace or project some of this feeling onto the patients who are recipients of the drug. They would feel special, quite important, and sense that there was an increased investment in their condition and welfare. Should the drug prove helpful to them, this improvement might be amplified by this type of psychological response. In addition, they might have considerable need to please the investigator and respond as he unconsciously wishes.

In this connection it might be appropriate to mention the situation of a project set up to test the effect of lighting on the efficiency of factory workers. A group of employees in a single department was chosen for the study. It was found that with improvement in lighting, worker efficiency increased proportionately, and to everybody's amazement a decrease in lighting effectiveness resulted in a further increase in efficiency. In looking into this, it was quite clearly demonstrated that the efficiency changes were related not only to changes in the lighting, but were also due to the fact that this group of workers thought of itself as being special, observed and doing what was expected.

In addition to the omnipotence of the investigator, the dependent gratification coming from the special attention given to the patient, and the unconscious wish on the part of the patient to please by doing what is expected of him, there seems to be a mounting enthusiasm which before it is spent is transmitted not only from doctor to patient but also from patient to patient in a way that serves to often enhance the original omnipotent feelings as well as any physiological or pharmacological effect inherent in the drug itself.

An additional phenomenon often observed in patients in psychotherapy who are receiving such a new drug, is their responding in an exaggerated fashion not only on the basis of the previously enumerated factors of wanting to please, omnipotence and being special, but in addition their using the drug as a shield or excuse for the expression of feelings hitherto surpassed or repressed.

A very interesting example of this last point is the situation of an early middle aged scientist, one of whose difficulties was a

marked inability to form any close relationship. This manifested itself also in therapy when in over a year of weekly visits this patient could never permit herself to express any of her warm positive feelings for the therapist. This patient had had a number of previous episodes of marked agitation linked with some depression which appeared at times when she felt threatened with the possibility of a close relationship with a man. In the face of such a recurrent exacerbation of symptoms which, it had appeared, might necessitate hospitalization as it had in the past, it was decided as a last resort to give this patient one of the then most widely publicized drugs in the field of psychiatry. It was given more for psychological than for physiological reason, in part in response to the patient's need to be given something, and also because of inquiries which she herself had been making about this particular drug. Although superficially quite skeptical, it appeared that she had heard that some rather remarkable results had been attributed to the drug. It was given in sufficiently small doses so that the physiological effect could not possibly have been solely responsible for the rapid and marked release of warm positive transference feelings.

The patient reported her response essentially as follows: For two days after starting the medication she became increasingly depressed. On the third day she felt as though she "were more pushed to activity than ordinarily, and acted like somebody hopped up." In contrast to previously reported work difficulties, the patient said the following: "The day was perfectly normal and effortless, all confusion and distracted feelings were gone. This has persisted. Yesterday was a bad day with many interruptions—I did not flare up as I usually do. I did not mind it. It is as though I tried to be annoyed and irritated but could not get up enough steam, and the reasons for the interruptions all seemed valid to me. The thing I appreciate next to thinking better, is that I sleep very well without effort and wake in the morning feeling refreshed instead of my usual agonizing start in hating the thought of the day." She continued with some comments such as, "This is very interesting, I feel cheerful. No matter what caused this I am impressed with the fact that it is possible for me to function in this way—that I am capable of it. It is amazing what I can do when I get rid of my static. I do not think it is all the drug. The drug does not give you motivation." She reported that she wanted very much to come today, in contrast to previously reported resistance to her visits, so that she could tell about it "as if it were something that you personally had invented and I wanted to express my feeling of intense gratitude." The next thing she then did was to report a dream, this again in contrast to her usual inability to remember dreams. Following recital of the dream, the patient was then able to associate freely and to lead into a discussion of marked competitive feelings with men coupled with castrating impulses, quite spontaneously, as though this were something she had thought of for the first time.

In a subsequent interview following suggestions to the patient that dosage of the drug be reduced minimally, she reported that not only had she reduced the dosage but had in fact on many days forgotten to take her medication. She became increasingly agitated, depressed and developed considerable anger toward the therapist which she expressed in terms of her feeling that "you tricked me, you let me sit there and think it was the drug and it wasn't at all." Subsequent associations made it clear that in using the drug as an excuse, the patient was able for the first time in therapy to face some of her positive transference feelings, and that later the threat she felt in response to this, lead to marked anger and symptom formation as a defensive reaction.

A possible explanation for the psychological component in reaction to wonder drugs may follow a pattern. The hope of the investigator, coupled with the patient's need to please may produce improvement. Then because of the unusually good results, enthusiasm may spread and patients may use the drug as a cover-up or excuse to progress in an accelerated fashion. Gradually, as realities come into play, enthusiasm wanes leaving the stage ready for the next drug or for a more realistic appraisal of the actual physiological and pharmacological effects of the current drug.

Eastern Psychiatric Research Association Proceedings*

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Electro Cerebral Stimulation in Mentally Defective Patients

H. H. BERMAN, M.D., *Director*, and
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Willowbrook State School

This is a brief report of the effect of electro-cerebral stimulation on the mental defective. Willowbrook State School is an institution for mental defectives located on Staten Island, New York, under the auspices of the Department of Mental Hygiene. The school has a population of 4,480 patients, varying in age from babies in the crib to adults.

Although the patients are mentally defective, almost all of them show emotional symptoms of various types and degree and for this reason, psychiatric evaluation and treatment has always been considered important. Electric shock treatment has been used as a form of psychiatric therapy for many years. Some years ago, a large group of defective patients with behavior problems and assaultive aggressive behavior problems were given standard EST. The results, however, were uniformly poor.

Then we decided to try electro-stimulation with the Reiter apparatus, Model RC 47 D, on some patients and study the results. The indications for treatment have been as follows:

1. Repeated uncontrollable seizures in epileptic patients showing the characteristic epileptoid personality changes such as irritability, marked egocentricity, temper tantrums, and assaultive behavior.
2. Repeated attacks of status epilepticus in convulsive patients.
3. Long periods of marked overactivity, aggression, and assaultiveness in chronically disturbed patients.

The patients' age ranged from 2½ to 4½ years; the I.Q. from 3 to 75. Patients presenting the most severe behavior problems were chosen. Treatments are given twice weekly for five weeks. The patient is allowed a light breakfast and is given a hypodermic of atropine sulfate 15 minutes prior to treatment. The dosage depends on the size of the patient and varies from 1/75th to 1/100th of a grain. Dentures are removed and the patient is urged to empty his bladder. After treatment he is allowed to sleep or rest for one hour. The treatment is administered either by the bi-polar or mono-polar method. The patient is placed on the table, assumes a comfortable position with his arms folded across his chest and his fists clenched. No method of restraint or mouth gag is used, and treatment in both methods is first introduced by a grand mal convulsion. Following the convulsion, the brain is stimulated for a period of from five to fifteen minutes with the electrodes being applied in various areas on the skull. The amount of current applied differs with each patient, but is always such that no further convulsions are produced after the initial one. Following no more than 15 minutes of stimulation, the electrodes are placed over the frontal area for about two minutes. This area stimulates respiration. Only one to two milliamperes of current are used at this time, and during these two minutes the patient breathes easily, and quickly awakens.

The mono-polar method is used in those cases where the patient's ability to tolerate deep treatment is limited and it is, therefore, valuable because it becomes possible, through this method, to go from one side of the cranium to the other avoiding overstimulation of any one area.

Twenty-three patients have been treated with electro-cerebral stimulation since Sept. 2nd, 1955. Very few complications have been noted in conjunction with the treatments. Occasionally a patient may become cyanotic during treatment. This cyanosis is easily relieved by either reducing the amount of current administered or placing the electrodes over the frontal area, stimulating respiration. Each patient is given at least ten treatments and then observed for a period to see whether or not he requires further treatment.

Of the 23 patients under treatment, 11 were severe convulsives, having anywhere from one to 25 grand mal seizures per month. These convulsives have all shown a drastic reduction in the number of spontaneous seizures during and after treatment, they are also more alert and comfortable than they were previously. As a group, they are less confused and irritable than they had been prior to treatment. They are easier to get along with on the ward and are not as destructive or assaultive.

Eight non-convulsive patients have completed a course of at least ten treatments. Of these, five have shown improvement and three have shown no improvement. The improvement has been mostly in their behavior. Previously they had been overactive, destructive, assaultive, kicked, bit, and scratched themselves and others. Now they are calmer, responsive to attention, non-destructive, and not assaultive. Several are more alert. Several are able to partake in ward activities. Some, who heretofore were helpless in that they could not feed or dress themselves, now are able to do so, and even can line up with the rest of the ward at mealtime. Besides the 19 patients reported on, four patients still are undergoing treatment and have not completed their ten treatments. Of the four, one is a convulsive, the other three are non-convulsives. The convulsive patient has had four treatments to date and has not shown any change. Two of the other three have had four treatments each and one has had five treatments. Two patients have shown good improvement in that they no longer are assaultive. One patient is improved. Five of the 23 patients

*Meeting of April 5, 1956 held at Kings Park State Hospital, Kings Park, N. Y.

treated require follow-up treatment. One is a convulsive who requires a treatment once a month, usually just prior to her menses. The other four receive one treatment a week. These follow-up treatments are given to the patients in order to maintain thir good level of improvement.

TABLE 1

Results in Patients Who Have Completed at Least 10 Electric Cerebral Stimulation Treatments

Name	Age	Mental Status	Diagnosis	Marked Improvement	Improved	No Improvement
P.S.	10	I.Q. 27	M.D. Infection Post-Vaccinal	x		
H.G.	12	I.Q. 30	Undiff.	x		
L H.	24	I.Q. 46	M.D. Infection Cong. Lues	x		
J.S.	11	I.Q. 40	Undiff.	x		
B.R.	15	I.Q. 52	Undiff.	x		
C B.	16	I.Q. 72	Epilepsy		x	
D.C.	12	I.Q. 34	Undiff.			x
N.B.	16	I.Q. 20	Undiff.		x	
R R.	16	I.Q. 52	Undiff.	x		
B.P.	19	I.Q. 30	Undiff.			x
L.A.	16	I.Q. 26	Undiff.			x
V.M.	22	I.Q. 51	Due to Trauma During Birth	x		
A.P.	9	I.Q. 29	Familial	x		
M.C.	23	I.Q. 75	Due to Epilepsy	x		
E.G.	10	I.Q. 23	Due to Epilepsy		x	
A.G.	8	I.Q. 38	Due to Infection (Meningitis-Type Unk.)		x	
R.O.	13	I.Q. 13	Due to Infection (Post Meningitis)			x
W.K.	21	I.Q. 15	Undiff.			x
D.E.	2	I.Q. 19	Due to Trauma During Birth	x		

TABLE 2

Effect of Electro-Cerebral Stimulation on the Epileptic Patients

Name	No. of Spon. Seizures per Month Prior to Treatment	No. of Spon. Seizures During & After Treatment per Month
P.S.	12	4
L.H.	12	3
D.E.	20-25	0
C.B.	17	0
A.P.	12	2
M.C.	2	0
E.G.	15 Gr. Mal	13 Petit Mal
A.G.	5	2
R.O.	9	During Tr. 4 After Tr. 12
H.G.	1	0
W.K.	3	0

TABLE 3

Results in Patients Who Have Completed at Least 10 Electric Cerebral Stimulation Treatments

No. of Cases	Age Range	Mental Status	Marked Improvement	Improved	No Improvement
19	2½-24½ Yrs.	I.Q. 3-75	10	4	5

It may also be noted in reference to electro-cerebral stimulation, that the patients do not suffer the usual type of confusion accompanying other forms of electric shock treatment. Almost all of them are practically wide awake upon completion. They are able to carry on a conversation, seem relaxed, are not frightened, and make no complaints.

Treatment of 23 patients with this type of electric shock is reported. Although not enough cases have been treated to reach any definite conclusion, it would seem that electro-cerebral stimulation is of value in the treatment of the mentally defective.

Electro-Sleep Treatment in a Chronic Disturbed Service

MAURICE FENICHEL, M.D.

Supervising Psychiatrist, Kings Park State Hospital

Ever since its first use in 1939 electricity has been utilized in treatment of nervous and mental disorders. It has been suggested that, beside convulsions, the electricity would produce metabolic changes in the brain cells which may partly explain the practical results obtained.

In recent years further advances have been made and improvements have been achieved by Reiter's Electro-Stimulator in giving these treatments either in the form of grand mal electro-stimulation or Pentothal non-convulsive electro-sleep.

I started these treatments on my chronic-disturbed service on January 9th, 1956. All the cases had been treated previously with various types of sedation, with electric shock treatment, many cases with combined insulin-electric shock, with tranquilizing drugs—Thorazine, Serpasil or combined and in one case also psychosurgery was performed, without significant results.

Group One: In the first group of eight patients we had two cases of dementia praecox, simple, one case of dementia praecox, hebephrenic, three cases of dementia praecox, paranoid and two cases of dementia praecox: catatonic.

Of the two dementia praecox, simple cases one was a 23 year old patient, hospitalized for two years, emotionally unstable, fearful, alternating with agitated and depressed stages. After Thorazine the symptoms of downheartedness became worse. Previous ECT without results. After 14 treatments with Pentothal electro-sleep, this patient became more stable emotionally, participated in ward routine, also in group psychotherapy, was placed on convalescent care and is getting along fine. The second patient is 25 years old, hospitalized for seventeen years. Combined insulin-electric shock was administered without result. Through many years he was tense, unstable. Pentothal electro-sleep seemed to be indicated but under this treatment he became more withdrawn, nearly mute. Then it was changed for grand mal electro-stimulation and after fifteen treatments, the patient seemed better, in good spirits, cooperative, has outdoor privileges, has already been on a home visit and his placement on convalescent care in the near future is considered.

The case of dementia praecox; hebephrenic, is a 27 year old patient, emotionally unstable, regressed, unclean in habits, gradually withdrawing. After 20 treatments of grand mal electro-stimulation this patient displays more drive then at any time before and takes part in ward routine. The outstanding feature is that he became cleaner and tidier.

Three cases of dementia praecox paranoid. One is a 31 year old, hospitalized for one and a half years. Patient displayed anxiety, crying spells, was frightened. Electric shock therapy and thereafter Thorazine were given without result. After 22 treatments with Pentothal electro-sleep, this patient seems to be well stabilized, cooperative, in good spirits, became a good ward worker, thinking seems to be much clearer. His placement on convalescent care in the near future is being prepared. The second is a 62 year old patient. Electric shock treatment and Thorazine were without result. He has always been tense, hostile, antagonistic, with distorted thinking. Twenty-two Pentothal electro-sleep treatments showed improvement only in behavior but basic paranoid features remained unchanged. The third of these patients, 39 years old, hospitalized for nine years, always tense, delusional, unstable, hostile. Electric shock treatment gave little result. Thorazine had been tried without improvement. After 22 grand mal electro-sleep treatments, this patient still shows little improvement. His basic paranoid features are unchanged.

Two cases of dementia praecox; catatonic. The first, a 32 year old dementia praecox, catatonic patient, hospitalized for 14 years. He has been rigid, dull, hostile, delusional, underactive. Ten grand mal electro-sleep treatments were given without result. The second, a 23 year old dementia praecox, catatonic patient, withdrawn, mute, a very malignant case. Psychosurgery had been performed without result. After ten grand mal electro-sleep tratments symptoms were unchanged.

Results in This Group of Eight Patients. In 50 per cent of the cases we had improvement. In three cases good, in one case the result was fair, in four cases no significant change.

Group Two: We started treatment on this second group of eight patients February 23rd, 1956. The first in this group was a 26 year old, dementia praecox, hebephrenic patient, hospitalized for five years. Combined insulin-electric shock treatment was without significant result. The patient became withdrawn, emotionally unstable, with many catatonic-like features, underactive, silly. After grand mal electro-sleep treatment, there has been gradual improvement. Patient is more alert, participates in ward routine, is sociable and in better contact. The second in this group is a 62 year old dementia praecox, hebephrenic patient who looks much older. He has been hospitalized for seven years, had outdoor privileges but since February 1956 he became silly, depressed, withdrawn, suspicious, with suicidal trends. After grand mal electro-stimulation, he improved, is in very good contact, is happy, relaxed, and emotionally, much more stabilized. Privileges have been given back to him and placement on convalescent care in the near future is considered. The third case is a 26 year old, dementia praecox, hebephrenic patient hospitalized for four years. Patient is rigid, withdrawn, self-absorbed and showed no interest. After 20 grand mal electro-stimulations, he makes a better impression, is more alert and attentive, not so rigid, had home visits, gets along well, and seems to be better than ever before during these four years. The fourth patient is a dementia praecox, catatonic, 40 years old, hospitalized for six monthss. Electric shock treatments were without result. Patient is tense, irritable, excited, agitated, with aggressive tendencies. Under Pentothal electro-sleep he seems definitely better, is quieter, more relaxed, sensorially in better contact. Number five is a 16 year old patient, with severe secondary behavior disorder after organic brain damage with convulsions. Patient was destructive, tense and very disturbed. Thorazine and Serpasil were administered in very high doses without improvement. Pentothal electro-sleep caused a little temporary improvement. The basic features remained the same. Number six in this group is a general paresis patient with many catatonic-like features, he has been hospitalized for six months. Patient is 42 years old, very disturbed, overactive, noisy, annoying other patients, restless and disturbing the whole ward. After a full course of penicillin treatment and Thorazine without result, Pentothal electro-sleep treatment gave temporary improvement in his behavior but essentially there is no improvement in this case. Number seven is a 41 year old dementia praecox, paranoid patient hospitalized for five years. Previous insulin-electric shock treatment was of no avail. Pentothal electro-sleep has been tried but the features of the psychosis remained unchanged. The last case a dementia praecox, catatonic case, 23 years old, hospitalized for three months, seclusive, withdrawn, rigid, unstable, delusional and unpredictable. Pentothal electro-sleep gave little result and basically the case is unchanged. Among the second group of eight patients we had good results in one case, three cases fair, in four cases no results. In general 50 per cent improvement has been noted with electro-sleep.

Summary

(1) The indication for Pentothal electro-sleep is in general the case with increased tensions, anxieties, disturbed or aggressive behavior, with increased motor discharge phenomena. Grand mal electro-stimulation seems to be indicated in depressions, hyperactivity, downheartedness. We must state that there are exceptions to this conclusion. We had cases which we mentioned where we had to change the treatment from grand mal to Pentothal or in reverse.

(2) The *contra-indications* seems to be the same as in electric shock treatment.

(3) *Age Group Between 18 and 65.* All these patients took the treatment well. There has been no parallelism between the age of the patient, the reactions or results in the treatment.

(4) *Risk or Complications:* We may safely say that the risks and complications are less than in electric shock treatment. The respiration is easily regulated. There have been no cases of apnea or hypopnea. Cyanosis can be prevented or improved by stimulation of the brain. In bipolar treatment we used electric current of five to ten milliamperes; in unipolar treatment we achieved the same results with less current, below five milliamperes. We are able to reduce the bronchial secretion and salivation by use of atropine sulfate one seventy-fifth of a grain by hypo, possibly up to one fiftieth of a grain which has a full effect after from 30 to 60 minutes. In recent reports fatalities were described in electro-shock treatment caused by severely increased and stagnating bronchial scretion. After treatment with atropine sulfate there is very little salivation or bronchial secretion. The cardiovascular system in general is little influenced by this therapy. There is a tachycardia usually up to 150 per minute during the grand mal treatment, also the systolic blood pressure goes up to 140, even to 160, but the diastolic blood pressure has shown little change. Occasionally we saw mild extra systoles in grand mal treatment which disappeared immediately, when the grand mal state was over. It is recommended, that in addition to general physical examination, a routine electro-cardiogram should be done before the treatment is started.

(5) Electro-sleep treatment has given fair results in several shock resistant cases.

(6) The question of over and under treatment can be determined easily by individually appropriate regulation of the milliamperes and ratio.

A Preliminary Evaluation of Electro-Sleep

IRVING PINSLEY, M.D.

Supervising Psychiatrist, Kings Park State Hospital

This paper is limited to an evaluation of the results obtained in our first series of eight patients. This treatment was first begun in our hospital in November 1955 and consisted of seven schizophrenias of the catatonic and paranoid type and one case of involutional melancholia.

In the schizophrenias the duration of the illness varied from one to six years and during this period they have had electric shock therapy, deep insulin coma and in some instances combined electric shock and deep insulin coma as well as Thorazine. One of these patients who has already been released following therapy has even had a lobotomy. All of these individuals resided on the insulin ward where, in addition to the specific treatments, they lived in a very permissive atmosphere, including a great deal of socialization processes and all of the other ancillary therapies such as recreational, occupational therapy, etc. In addition, because of the small population on this ward, they were given much more than the usual individual approach, including the physician.

The one case of involutional melancholia who has also been released from our hospital has had several courses of electric shock therapy under sodium pentothal intravenously as well as Thorazine. In spite of this intensive approach he had to be transferred to a continuous service ward where the only hope remaining was a spontaneous improvement.

At the time that electro-sleep therapy was initiated the release of any of the patients included in this study was not even contemplated. They were then returned to reside on the insulin ward with its many activities during which time the electro-sleep was administered. Five of the individuals received 20 treatments; the involutional case received nine and the others received 13 treatments. In some of the patients the anesthetizing agent was the usual grand mal electric shock while in the others intravenous sodium pentothal was used.

Of the four male patients one resulted in complete failure while three improved sufficiently to be released from our hospital and are now functioning adequately including productive employment.

Of the four females, one whose illness was of six years duration and who showed the greatest amount of intellectual deterioration, improved sufficiently to be released and is now caring for her household, husband and children adequately.

Of the remaining three, one patient showed no improvement whatever while another showed slight improvement but not sufficient for release consideration. Another of the female patients was much improved but relapsed and is now being carried once weekly as maintenance.

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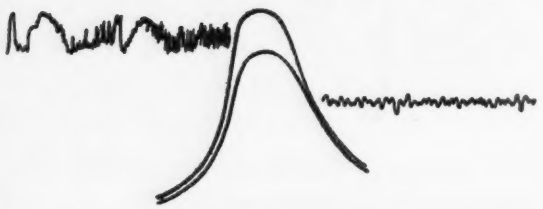

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2. Livingston, S., and Petersen, D.: To be published.
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